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(54) ELECTRICAL CONNECTOR

(71) We, RIST'S WIRES & CABLES LIMITED, a British Company of Well Street, Birmingham, England, do hereby declare the invention for which we pray that a
 5 Patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an electrical connector of a type which is designed to be lodged in a recess in a housing for the connector, the connector having at least one tongue which extends from the connector intermediate the ends thereof and serves to oppose disengagement of the electrical connector from the recess.

According to the present invention, there is provided an electrical connector comprising an elongate, electrically conducting body, one end of said body being formed to be connected with an electrical lead, an opposite end of said body being formed to be engaged with another electrical connector, and at least one tongue extending from said body intermediate said ends for opposing disengagement of the electrical connector from a recess in a housing for the electrical connector, the or each tongue being integrally joined to the body and having a pair of side edges extending from the integral joint in the longitudinal direction of the body and being inclined away from the body, the integral joint between the or each tongue and the body extending
 35 along a line which is non-perpendicularly disposed relative to a longitudinal axis of the body.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a plan view of an electrical socket connector according to the present invention,

45 Fig. 2 is a part sectional elevation of the

electrical socket connector of Fig. 1,

Fig. 3 is an end view in the direction of arrow A of the socket connector of Fig. 2,

Fig. 4 is an end view in the direction of arrow B of the socket connector of Fig. 2, 50

Fig. 5 is a part sectional side elevation of an electrical pin connector also according to the present invention, and

Fig. 6 is a longitudinal sectional view, on a smaller scale, of a housing in which is fitted the pin connector of Fig. 5. 55

Referring to Figs. 1 to 4 of the drawings, the electrical socket connector comprises a body 10 formed by a cutting and bending operation on a brass sheet, and a pair of opposed tongues in the form of lances 11 which are integral with the body 10 and extend therefrom intermediate the ends of the body 10. One end 12 of the body is formed in a manner well known *per se* to enable it to be connected to a bared end of an electrical lead (not shown) by a crimping operation. Since the shape of the end 12 of the electrical connector is well known and forms no part of the present invention, it will be described in no further detail. The opposite end 13 of the body 10 is open and is of circular cross-section to receive another electrical connector in the form of the pin connector of Fig. 5. Between the lances 11 and the said one end 12, the body 10 is provided with an abutment 14 which is formed by an integral loop extending from the body 10. The purpose of the abutment 14 will be described hereinafter. 65 70 75 80

Each lance 11 is in the form of a planar quadrilateral plate and is formed integrally with the body 10 during manufacture of the latter by forming (i) a cut extending transversely of the body 10, the cut being angled relative to a plane normal to a longitudinal axis of the body 10, and (ii) a pair of parallel cuts extending from the transverse cut longitudinally of the body 10 85 90

towards said opposite end 13 of the body 10. The longitudinally extending cut which is lowermost as viewed in Fig. 2, is longer than the upper longitudinal cut so that when the lance 11 is bent outwardly of the body 10, bending occurs along dotted lined C-C (see Fig. 2)). Because of the angled transverse cut and because of the bending operation on line C-C, an edge 15 at the free end of the lance is angled relative to the body 10 so that one end of the edge 15 lies further away from the longitudinal axis of the body 10 and also nearer to the opposite end 13 of the body than an opposite end 17 of the edge 15. As can be seen from Figs. 3 and 4, the edges 15 of the lances 11 are substantially parallel so that the end 16 of the right hand lance 11 as viewed in Fig. 3 is below the opposite end 17 of the same lance 11, whilst the relative positions of the ends 16 and 17 of the left hand lance as viewed in Fig. 3 are reversed.

Referring now to Fig. 5, the pin connector illustrated therein is similar to the socket connector of Figs. 1 to 4 and similar parts are accorded the same reference numeral, prefixed by 1. The only difference between the two connectors is that end 113 is closed, has an external diameter of a size to be an interference fit within end 13 of the socket connector, and is also extended further way from lances 111 than is end 13 from its respective lances 11.

Referring now to Fig. 6, the pin connector of Fig. 5 and the socket connector of Figs. 1 to 4, are engaged in an identical manner in recesses 18 in an electrically insulating housing 19. The location of the electrical connector in the recess 18 will be described with reference to the pin connector of Fig. 5. The recess 18 in the housing 19 is provided with an internal, annular shoulder for engagement between lances 111 and with abutment 114. Before engagement of the pin connector in recess 18, the bared end of an electrical lead 21 is secured to the body 10 by effecting a crimping operation on end 112. Then, end 113 is inserted into the recess 18 at the right hand side of the housing 19 as viewed in Fig. 6. As the body 110 passes into recess 18, the lances 111 are deflected inwardly by the shoulder 20 until end 116 on each lance 111 has passed beyond shoulder 20. When this has occurred, each lance 111 is partially freed so that it can spring outwardly relative to the body to lodge behind shoulder 20 because of the angling of edge 115 and the positioning of end 116 relative to end 117, there is an inherent tendency for the lances 111 to draw the body 10 further into the recess 18. Whilst this is happening, abutment 114

comes into engagement with the opposite end of shoulder 20 so that the shoulder 20 is trapped firmly between lances 111 and abutment 114 whereby the body 110 is held firmly in the desired position within recess 18. When the body 110 is positioned correctly, both lances 111 have passed fully beyond shoulder 20 and sprung outwardly so that the ends 117 of edges 115 dig into the adjacent end of shoulder 20 to prevent accidental withdrawal of the body 110 from recess 18.

Attention is drawn to our copending British Patent Application No. 19081/74 (Serial No 1 509 201) from which the present application is divided.

In explanation of the present invention, it is pointed out that electrical connectors of the male and female type are commonly formed from brass strip with the tongues joined to the tubular body along respective join lines which are perpendicular to the axes of the connectors. Since these connectors are formed by cutting and bending the strip so that the axes of the connectors are perpendicular to the longitudinal direction of the strip, the join lines extend in the longitudinal direction of the strip. This produces a relatively weak joint because of the longitudinal alignment of crystals in the strip as a result of the manner in which the strip is manufactured.

WHAT WE CLAIM IS:—

1. An electrical connector comprising an elongate, electrically conducting body, one end of said body being formed to be connected with an electrical lead, an opposite end of said body being formed to be engaged with another electrical connector, and at least one tongue extending from said body intermediate said ends for opposing disengagement of the electrical connector from a recess in a housing for the electrical connector, the or each tongue being integrally joined to the body and having a pair of side edges extending from the integral joint in the longitudinal direction of the body and being inclined away from the body, the integral joint between the or each tongue and the body extending along a line which is non-perpendicularly disposed relative to a longitudinal axis of the body.

2. An electrical connector as claimed in claim 1, wherein the body is partially tubular and the or each tongue extends from the tubular part of the body.

3. An electrical connector as claimed in claim 1 or 2, wherein the tubular part of the body is of circular cross-section.

4. An electrical connector as claimed in claim 1, 2 or 3, wherein said opposite end of the body is open and is adapted to receive a male-type connector.

5. An electrical connector as claimed in claim 1, 2 or 3, wherein said opposite end of the body is adapted to be engaged in a female-type connector.
- 5 6. An electrical connector as claimed in any preceding claim, wherein the or each tongue is in the form of a quadrilateral plate.
7. An electrical connector as claimed in 10 any preceding claim, wherein the or each tongue is in the form of a plate which is arranged, in use, to oppose engagement from the recess in the housing by digging into the housing.

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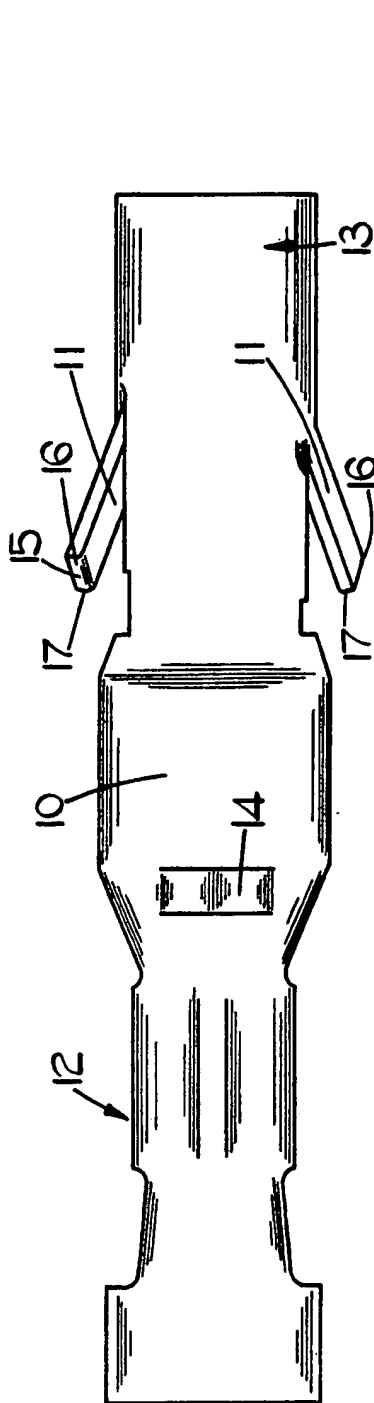


FIG. 1.

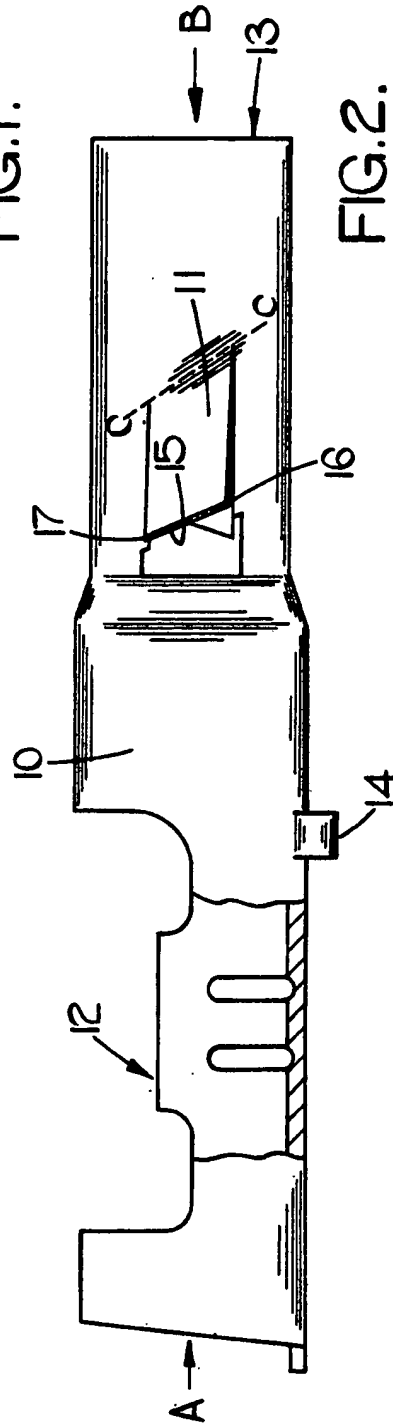


FIG. 2.

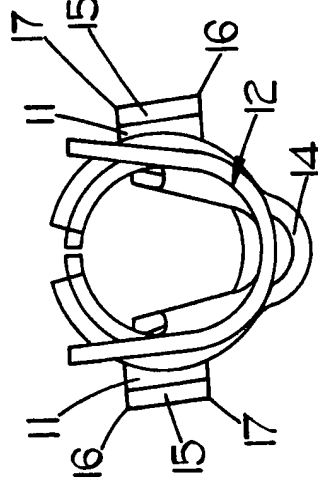


FIG. 3.

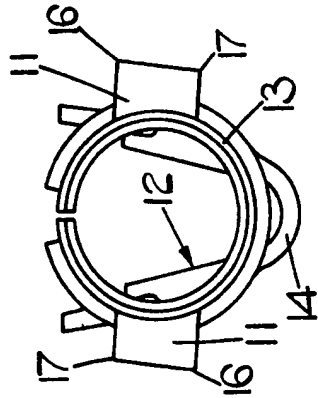


FIG. 4.

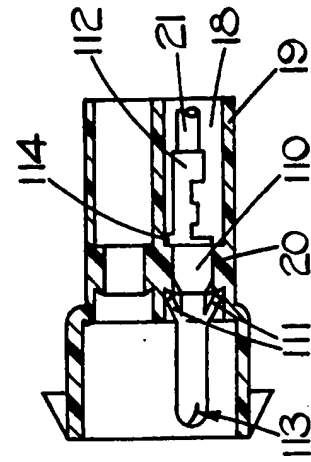


FIG. 6.

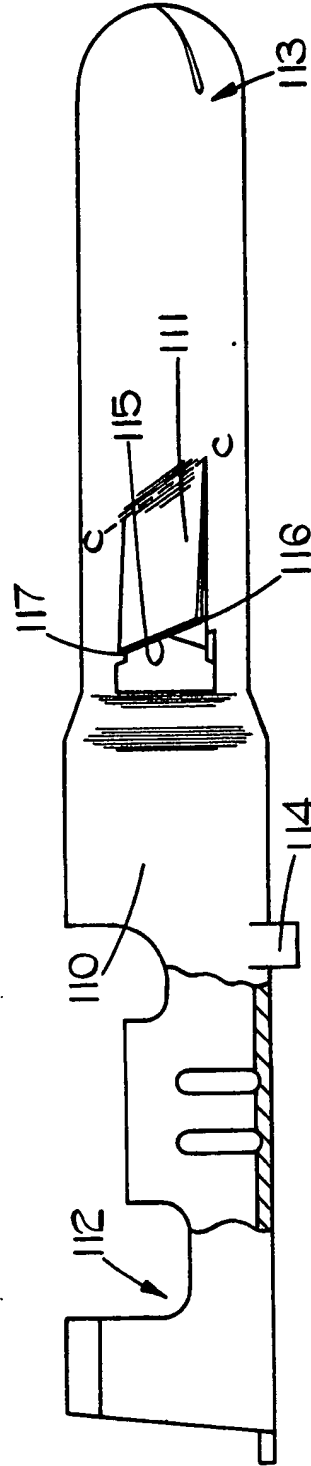


FIG. 5.